

A connecting piece for a tubing

The invention relates to a connecting piece for a tubing comprising a first unit
5 and a second unit, said first unit comprising a first connecting element for a
tubing element and a second connecting element for the second unit, said
second connecting element comprising a tubular female part for engagement
with the second unit, and first sealing elements, and said second unit
10 comprising a tubular male part with a collar; and second sealing elements for
cooperating with the first sealing elements; said first and second units further
comprising separator elements.

DE-U-29818311 teaches a connecting piece in particular for medical infusion
systems. That connecting piece comprises a male and a female part, wherein
15 the male part is further provided with a collar with undercuts, said undercuts
fitting into a corresponding collar on the female part such that the two
undercuts combine to form a kind of hook connection, whereby the male and
the female parts are securely locked by means of those devices when the
connecting piece is assembled. However, it is associated with the drawback
20 that said locking elements that also serve more or less as separator elements
are arranged externally on the connecting piece, with an ensuing increased
risk of breaking off or becoming damaged during mounting or dismounting.
Likewise, it is a matter of concern that when used repeatedly the hooks will
come to suffer from material fatigue and break due to the forces to which
25 they are exposed, in particular during dismounting. The minute these locking
elements break off, the connecting piece is very likely to leak, due to the
sealing as such being accomplished exclusively by a press-fitting between
the inner face of the female part and the outer faces of the male part.

30 Moreover, the system is associated with the drawback that when the male
and the female part are to be separated it is possible to perform this only the

one way around, and likewise assembly presupposes orientation of the male and the female part and that the turning takes place in a direction opposite that of the dismounting.

- 5 It is thus the object of the present invention to provide a connecting piece, whereby said problems are solved. As opposed to the ones taught in the German utility mode, the present invention provides good locking and sealing of the assembly without a risk of leakage and unintentional separation from each other of the two connecting parts, the lock thus being internal and
10 protected, which ensures good engagement simultaneously with the separator elements operating independently of lock as well as sealing. Moreover these separator elements can further be activated independently of orientation and while providing a relatively small and controlled force. This further contributes to reducing the risk of damaging the connecting pieces
15 both during assembly and separation.

This object is obtained with a connecting piece of the kind described above and configured as featured in the characterizing part of claim 1.

- 20 By the invention the sealing elements comprise, on the first unit and on the second unit, preferably tooth-like protrusions with faces that extend transversally to the axial extension of the male part and the female part, and that exhibit an inclination in the direction of the periphery of the male/male part in relation to said axial extension, said inclination being less than 90°.
25 Thereby these faces will ride each other when the first unit is turned in relation to the second unit about an axis defined by the axial extension of the female and the male part, whereby an axially extending force component is provided that releases the engagement between the sealing elements, ie a deactivation of the locking device simultaneously with the male part moving
30 away from the female part when said faces ride each other. The faces may extend continuously around the male or the female part.

The connecting piece comprises two units – a first and a second unit – of which the one unit is constituted by a female part, while the second unit is constituted by a male part. During assembly of male and female part a close connection is provided due to the provision at the upper part of the male part of sealing elements and certain locking elements, on the one hand in the form of an annularly extending recess and, on the other, in the form of a flange. An annular recess fits into a corresponding annular bead mounted on the inner face of the female part, and where a click is provided, ie audible locking, when this recess engages around the bead. Moreover the female part comprises an annular recess, the side faces of which are axially parallel with the axis of the female part, and wherein they engage and enclose the flange of the male part. Firstly, good sealing is accomplished by this, since a sealing is provided both between recess and bead, which - as it is - also provide the locking device, and likewise a further safety sealing is accomplished between the flange and the annular recess. It is thus possible to avoid liquid seepage even when a liquid pressure of at least 125 mm bar is applied to the assembly.

At the opposite end of the female part, where the tubular part terminates, a delimiting edge is provided in the form of an edge that follows the shape of a wave, preferably with at least two tongues that are even and extend continuously in their circumference. The delimiting edge that follows the shape of a wave is congruent with a correspondingly configured collar that appears mounted around the outside of the male part and in the area that is at a distance, typically 1-2 cm, from the locking and sealing elements of the male part.

If a turning is subsequently performed of the male part, either in the one or the other direction, the inclining walls provided due to the waved shape on both the male and the female part will push against each other and hence

push the assembly apart and break the locking connection established between the male part and the female part in the sealing area. Hereby easy separation of the two units is accomplished without considerable use of external forces, and likewise the sealing between the male and the female part is exceptionally good. The separator elements on the one hand and the sealing and locking elements on the other hand are constructed and operate independently of each other.

Provision of a connecting piece according to the invention and as further featured in claims 2-4 provides a convenient configuration of the delimiting edge of the female part and the collar of the male part, such that the convenient separation may take place. Since the distance measured between the wave crests is the same all the way around, heeling of the male part when twisted is obviated since the separation forces will be evenly distributed on all sides of the male and the female part. Besides, the shape ensures that the transition between male and female part is smooth and thus tearings do not occur either.

By providing a connecting piece according to the invention and as further featured in claim 5, one the one hand good sealing is accomplished and, on the other, convenient locking between the male and the female part, and wherein this locking can be heard, as a clicking sound will be generated when the recess travels past the bead.

By providing a connecting piece according to the invention and as further featured in claim 6, a further sealing is accomplished, which sealing as such comprises both the lateral and the medial side of the flange.

By providing a connecting piece according to the invention and as further featured in claims 7 and 8, it is accomplished that the flange slides into the

annular recess and without a risk of being positioned erroneously during assembly.

By providing a connecting piece according to the invention and as further
5 featured in claim 9, it is accomplished that the recess will, with the least possible resistance slide across the bead, while simultaneously the height of the bead as such brings about good locking and good sealing.

By providing a connecting piece according to the invention and as further
10 featured in claim 10, regulation of the liquid connection through the connecting piece is accomplished, since it is the primary objective of the connecting piece to adjust the emptying of bags, eg urine bags.

By providing a connecting piece according to the invention and as further
15 featured in claim 11, a convenient and simple manner of providing the valve's on/off function is accomplished.

By providing a connecting piece according to the invention and as further
20 featured in claim 12, it is accomplished that there is no risk of the displacer means sliding out of its housing when it is activated.

The invention further relates to use of the connecting piece as featured in claim 13, and wherein this connecting piece, typically to the female portion as such, is associated with a catheter or a tubing for being connected to a urine
25 bag, while the male part is connected to a tube or the tubing of a urine emptying bag, the idea behind the invention being that it is to be used for the emptying of leg or night urine bags to large collector receptacles. In that connection the male and female part will typically be disconnected, since, of course, the displacer means is closed such that no seepage of liquid occurs.
30 When the leg bag is replete, a male part with connection to a collector receptacle is seized and inserted into the connecting piece and the displacer

means is displaced to its position such that free liquid passage is allowed. The optionally filled bag, preferably a urine bag, being in connection with the female part can now be emptied into the collector receptacle.

- 5 The invention will now be explained in further detail with reference to the drawing, wherein

Figure 1 is an exemplary embodiment of a connecting bag according to the invention and seen in a perspective view;

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Figure 2 shows the disclosures of Figure 1, shown cut through in the central plane;

Figure 3 is a sectional view of the section encircled in Figure 2;

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Figures 4, 5, 6 show different situations for the mutual arrangement of the male and the female parts during their assembly,

Figure 7 shows the male and the female parts, separate and in perspective
20 view;

Figure 8 shows the connecting piece for use in connection with a urine leg bag and a collector bag.

- 25 Figures 1 and 2 show a connecting piece 1 comprising a first unit 3 and a second unit 4, wherein the first unit 3 constitutes the so-called female part. The first unit 3 comprises a first connecting part 5 configured as a stub and for being connected to a tubing 2 in the form of a tubing element 6 that is connected primarily to a urine bag or constitutes a catheter tubing. Opposite
30 the tube stub the second connecting element 7 is arranged, which is also

hollow and cylindrically tubular such that liquid is enabled to pass from the first connecting part 5 to the second connecting part 7.

Typically, between the first and the second connecting part a valve 30 is introduced, said valve 30 being in its inner cavity provided with a displacer means 31 that has an opening and a closing position. In the opening position liquid may penetrate through a bore opening in the displacer means, the outer face of the displacer means being congruent with the inner faces of the valve housing, while, in its closing position, it will perform a closing of the liquid passage that exists between the first and the second connecting part.

Moreover, at each end the displacer means is provided with so-called stops 32, ie annularly extending beads having a larger diameter than the displacer means and the interior diameter of the housing as such, whereby it is prevented that the displaceable displacer means 31 is offset entirely out of the housing during use there of.

The second connecting part (7), which is thus a female part, encloses the second unit 4 of the connecting piece 1, which is, in principle, a male part, and comprising a tubular section of male part 10.

The second unit will, opposite the other end, be provided with a stub 35 into which a tubing can be shifted, whereby further liquid passage through the entire connecting piece 1 is enabled through this tubing 2. As mentioned, the second tubing comprises this male part, whose outer face is essentially congruent with the inner face of the female part and is delimited by a collar 11, said collar 11 having a delimiting 15 which follows the shape of a wave such that undercuts are not formed.

This means that the delimiting edge 15 of the collar is a continuously extending delimiting edge in such a manner that a connecting line between

any two points in relation to the horizontal plane does not exceed 90°. Typically the collar will comprise two tongues 16, and wherein these tongues are arranged diametrically opposite each other.

5 The delimiting edge 17 of the female part will have a course that is congruent with the delimiting edge 15 of the collar and having an outer diameter that corresponds to the outer diameter of the collar to the effect that there is an even transition from the first unit 3 to the second unit 4. During twisting, ie
10 dismounting of the second unit 4 from the first unit 3, they are turned in mutually opposite directions, whereby forces are transmitted in the edge area between the delimiting edges of the female and male parts, and due to the inclined course, a turning off will occur, whereby the rotating movement is translated into an axially extending force component, whereby the male part is shifted out of the enclosure of the female part.

15 However, the delimiting edge 15 of the collar may assume several shapes other than the waved shape; it may be eg triangular flaps/tongues, and likewise there may be more than two. It is essential, however, that there are no less than two, precisely to ensure that the male part is not twisted wrongly
20 during dismounting.

Figure 7 shows the waved course of the collar for providing two tongues and the corresponding congruent course of the female part for also providing two
25 tongues.

The area between the delimiting edges of the male and the female part thus constitutes the separator elements 13 of the connecting piece 1. Opposite
30 this area, inasmuch as the tubular part 8 of the male part is concerned, the sealing elements 9, 12 as such are arranged as is the locking device 14 that will be subject to further discussion with reference to Figures 3-6.

The locking device 14 comprises essentially that the upper delimiting edge of the male part comprises an annular recess 20 which is thus open in radial direction. This recess, which will typically be about $\frac{1}{4}$ mm deep, will, during locking, enclose a bead 19 that extends annularly on the inner faces of the female part, designated first sealing elements 9, whereas the annular recess on the male part are designated second sealing elements 12, these two constructions, in addition to ensuring a locking between the male and the female parts, also contributing to ensuring a liquid-proof assembly between the male and the female part.

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The male part comprises a delimiting edge configured as an annularly extending flange 23, said annularly extending flange being delimited by taperingly extending delimiting side faces 25 that converge towards the delimiting edge 26 of the flange.

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The bead also having a taperingly extending face 27, the inclination of which corresponds essentially to the laterally facing, inclined side face of the annularly extending flange, small resistance is ensured when the male part is displaced into the female part, also since the flange has a smaller thickness than the remainder of the tubing thickness of the male part and therefore the flange part is more flexible.

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The sealing elements 9 comprise elements on the female part in the form of an annular recess 21 that forms a kind of pocket and wherein the delimiting side faces 22 of this annularly extending recess 21 are axially parallel to the centre axis of the female part. Essentially, this annularly extending recess has a width dimension that corresponds to the thickness of the flange. When the flange is shifted down into this annularly extending recess, it will typically be pressed against the side faces, preferably the side face located medially to the recess, whereby an additional sealing is accomplished. At the same time this arrangement of the flange, and as will also appear from Figure 6,

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will ensure an improved and close abutment of the annular recess that is pressed against the annular bead 19. It should moreover be mentioned that the medially arranged side face 28 for the annular recess in the delimiting edge comprises a laterally oriented beveling 29, the angle of which
5 corresponds essentially to the medially oriented, inclined face 25 of the flange, such that there is minimum resistance when the flange slides into the annular recess.

Figures 4-5 show different situations during assembly of the male and the
10 female part.

Figure 6 shows when the male part is arranged in the female part and the locking device is activated, ie the annular bead 19 is enclosed by the annularly extending recess 20 on the outer face of the male part, and that the
15 annularly extending flange 23 of the male part is situated in the annular recess of the female part, and wherein the medially facing delimiting face 25' of the flange 23 presses against the laterally facing side of the medially delimiting wall of the annular recess, whereby a sealing occurs in that area, simultaneously with a pressing occurring between bead 19 and the annular
20 recess 20. Hereby forceful sealing is ensured, and likewise the delimiting edge 26 of the flange presses upwards into the bottom of the annular recess and thus ensures yet a sealing.

Figure 8 shows the use of a connecting piece 1, wherein a leg bag 34 is
25 connected to the leg of a patient, and in the upper part there extends a catheter 36 from this leg bag for collecting urine, said catheter being connected to the urethra of the patient. Opposite the area where the catheter 36 is connected, the urine bag 34 is provided with a tubing element 6. This tubing element is further connected to a connecting piece 1 according to the
30 invention. The tubing element is mounted to the first connecting element of the first unit, which is configured as a stub.

On the stub 35 of the male part there is also mounted a tubing 2 that is connected to a discharge/collector receptacle 37. When the leg bag 34 of the patient is thus filled, the discharge bag 37 will typically be mounted with the tubing 2, on which the male part is secured upwardly, into the female part as such. The displacer means is subsequently displaced in the valve to the effect that the flow of liquid travels unimpeded through the connecting piece, following which the urine collected in the leg bag 34 is discharged into the collector bag 37. Subsequently the collecting receptacle 37 can be moved, as the displacer means is yet again arranged such that there is no passage of liquid within the connecting piece, and the male part in the connecting piece is dismounted from the female part following which the leg bag 34 is ready for renewed use.